with solutions of nitrate of potassium, in one series, which gave seeds, from which plants were grown "in which the stem and leaves were marked by very shaggy hairs, the leaves were definitely stalked, not sessile, distinctly stem-clasping, in shape ovate, with large sharp teeth." The new form, which did not conform to any known type, was carried "successfully" to the second generation but not beyond. These experiments were repeated in 1909–1910, but gave negative results.

Injection of salts into the ovary before fertilization, in dilutions of 1:1000, showed many failures by killing the "unfertilized ovules." Sodium chloride, nitrate of potassium, carbonate of ammonium, sulphate of sodium, and sulphate of iron were used. One series in which sodium chloride and carbonate of ammonium were injected into the ovaries of *E. roseum* showed "a number of aberrant forms of quite unknown type." "Three of the new forms were brought to bloom and maturity, and in one case to a second generation."

O. Lamarckiana when injected did not show any increased array of new types, but *O. odorata*, after the injection of carbonate of ammonia, produced a "bloom" "which reminded one strongly of *O. gigas*." It was sterile. In *E. hirsutum* only injections of nitrate of potassium gave results, and in one series there resulted a form that had many of the "features of another genus, namely *Circaea*," which reverted to the type of the parents in subsequent generations.

Apparently the paper is a preliminary announcement, and one regrets that it is not accompanied by illustrations and more data of the experiments and less of the general discussion of the problems. The chief interest in the paper lies in the fact that FIRTH apparently did not know of MACDOUGAL'S investigations along the same line, nor of the experiments of HUMBERT upon *Silene noctiflora*. FIRTH used the same methods that have been used by MACDOUGAL, but somewhat stronger solutions, and his results are an important confirmation of the general results obtained and methods employed by MACDOUGAL.—W. L. TOWER.

Effect of neutral salts upon plants and animals.—OSCAR LOEW[11] has investigated the effects of neutral salts upon the lower animals and plants. He finds that a 0.2 per cent solution of di-potassium oxalate more poisonous to infusoria than a 1 per cent solution of di-potassium tartrate. Infusoria, copepods, and rotatoria, which are able to live 24 hours (and some 3 days) in a 0.5 per cent di-potassium tartrate, die in 30–40 minutes in a 0.5 per cent solution of di-potassium oxalate. Seedlings of radish, clover, and barley, with root length of 1–3 cm., exposed to 0.5 per cent of the oxalate at a temperature of 12°–15° C., show loss of turgor in the root cells within 24 hours, and decay immediately follows, while in an equimolecular solution of the tartrate or a

[11] LOEW, OSCAR, Über die Giftwirkung von Oxalsaurensalzen und die physiologische Funktion des Calcium. Biochem. Zeitschrift **38**:226–243. 1912.

0.5 per cent solution of sodium nitrate, they suffer little or no injury. Pea seedlings die in 2 days in a 0.5 per cent of sodium oxalate, but are still uninjured in an equally strong solution of sodium acetate.

In *Spirogyra* the first structure to show the effect is the nucleus, which contracts and becomes lens-shaped. A little later the chloroplasts begin to contract. LOEW finds that the effect is not due to acidity, since 0.005 per cent of oxalic acid is more injurious than 0.01 per cent of citric acid, and 0.0001 per cent more injurious than 0.001 per cent of tartaric acid.

LOEW concludes that the injurious effect of the oxalates is due to the extraction of calcium from the nucleoproteins, chromatin, and plastin, and its replacement by potassium or some other element, and their bringing about a change in the imbibing power of the different parts of the protoplasm. He thinks that calcium is an essential element in the cells of the higher animals and plants.—J. N. MARTIN.

Sutcliffia.—Miss DE FRAINE[12] has made a painstaking investigation, by means of the well known wax plate method of modelling, of the vascular system of *Sutcliffia*, a new genus of the Medulloseae established by SCOTT. Unfortunately the specimen is rather badly dilapidated and for that reason a certain reserve is necessary in interpretation. The vascular system as described by Miss DE FRAINE consists of a large axial "protostele" (sic!) surrounded by three more or less clearly identifiable "meristeles." In addition to these are a number of "extrafascicular" bundles. By a process of reasoning which it is difficult to follow, the author identifies the central "protostele" with the ring of bundles in the Cycadales. It would seem to be in accordance with the general principles of vascular anatomy to regard it as a medullary bundle, and the three surrounding strands as corresponding to the cylinder system of bundles, a conclusion rendered extremely probable by the fact that it is with these that the leaf traces become continuous. *Sutcliffia* is considered to be a primitive type regardless of the fact that it has an extremely multifascicular foliar supply. This would appear to be entirely against all established principles of anatomy. It is gratifying to find that English authors are gradually coming around to the standpoint in regard to the affinities of the Cycadales, namely as rather with the Medulloseae than the Lyginodendreae, which has been held in continental Europe and this country for more than a decade.—E. C. JEFFREY.

Cause of leaf fall.—In a limited series of experiments conducted with detached twigs of various deciduous trees placed in water in a saturated atmosphere, VARGA[13] has attempted to establish the relationship between this

[12] DE FRAINE, E., On the structure and affinities of *Sutcliffia*, in the light of a newly discovered specimen. Ann. Botany **26**: 1031–1066. *figs. 19. pls. 91, 92.* 1912.

[13] VARGA, OSKAR, Beiträge zur Kenntnis der Beziehungen des Lichtes und Temperatur zum Laubfall. Oesterr. Bot. Zeitschr. **61**: 74–88. 1911.